

REMARKS

This is in full and timely response to the final Office Action dated April 29, 2004 (Paper No. 04272004). The present amendment amends claims 1 and 6, cancels claims 2 and 7, and otherwise disputes certain findings of fact made in connection with the claim rejections. Support for these amendments can be found variously throughout the specification, including, for example, dependent claims 2 and 7. No new matter has been added.

Entry of this Amendment is proper under 37 C.F.R. §1.116 since the amendment: (a) places the application in condition for allowance (for the reasons discussed herein); (b) does not raise any new issues requiring further search and/or consideration; (c) satisfies a requirement of form asserted in the previous Office Action; and (d) places the application in better form for appeal, should an appeal be necessary. The amendment is necessary and was not earlier presented because it is made in response to arguments raised in the final rejection. Entry of this amendment is respectfully requested. Reexamination and reconsideration in light of the above amendments and the following remarks is respectfully requested.

Claim Rejections- Alleged Double Patenting

In the Action, claims 1-10 were rejected under the judicially created doctrine of obviousness-type double patenting as allegedly being unpatentable over claims 1 and 10 of U.S. Patent No. 6,391,501 B1 to Ohnuma ("Ohnuma"). This rejection is respectfully traversed. However, in order to expedite prosecution, a terminal disclaimer prepared in accordance with 37 C.F.R. § 1.321(c) is attached to this Amendment so as to obviate this rejection. As demonstrated in the attached Terminal Disclaimer, the Ohnuma reference and the present application are commonly owned by Sony Corporation of Japan, as required by 37 C.F.R. § 1.130(b). Accordingly, withdrawal of this rejection is courteously solicited.

Claim Rejections- 35 U.S.C. § 103

Claims 1-10 were additionally rejected under 35 U.S.C. § 103(a) as allegedly being unpatentable over U.S. Patent 6,396,944 B1 to Kung et al. ("Kung"). This rejection is respectfully traversed.

Independent claims 1 and 6 recite a manufacturing method of a phase-shift mask and a method of making a resist pattern through exposure using a phase-shift mask, respectively, comprising, *inter alia*, seeking a relationship of optical conditions of an exposure optical system used for exposure and a mask structure with displacement of a pattern to be transferred by exposure, finding the optical conditions and mask structure that limit displacement of the pattern within a required range, taking manufacturing errors of the mask into consideration, and examining the optical conditions and the mask structure obtained to determine whether they ensure a required exposure tolerance and a required focal depth; wherein the optical conditions include, at least, a numerical aperture and a partial coherence factor.

As disclosed on page 4, lines 7-17 of the specification, the above-recited method allows a phase-shift mask to be manufactured so as to **limit displacement of the pattern within a required range**, as is recited in claims 1 and 6, while ensuring a lithography process tolerance is maintained, thereby resulting in improved transfer positional accuracy.

The Kung reference, in contrast, is not directed to improving pattern transfer displacement, but is instead concerned primarily with detecting defects present in phase shift masks which have been formed on transparent or opaque substrates. *See* col. 1, lines 34-43. Specifically, the Kung patent fails to disclose, teach or suggest the steps of seeking a relationship of optical conditions of an exposure optical system and a mask structure with displacement of a pattern to be transferred by exposure, and finding the optical conditions and the mask structure that **limit displacement of the pattern within a required range**, as is recited in claim 1 of the present invention.

In fact, as is demonstrated by the Abstract of Kung, the Kung reference examines the phase-shift masks for defects only **after** these patterns have been formed on their respective substrates. In other words, the inspection of the masks performed by the Kung reference occurs too late to limit transfer pattern displacement – the phase shift mask has already been formed on the substrate. Although the examiner argues that “the features upon which applicant relies ... are not recited in the rejected claim(s)”, independent claims 1 and 6 clearly recite the limitation of “finding said optical conditions and said mask structure that limit displacement of said pattern within a required range.” Thus, Applicant’s arguments are clearly supported by the plain language of the claims of the present invention.

In addition, the Kung reference fails to disclose, teach or suggest finding optical conditions that “include, at least, **a numerical aperture and a partial coherence factor**”, as is

recited in independent claims 1 and 6. As explained on pages 6 and 7 of the specification of the present invention, by examining optical conditions including, at least, a numerical aperture and a partial coherence factor, the present invention is able to ensure a required exposure tolerance and focal depth, thereby limiting pattern transfer displacement. *See* Figs. 6 and 7. The Kung reference, in contrast, fails to disclose, teach or suggest limiting pattern transfer displacement, much less examining optical conditions such as a numerical aperture and a partial coherence factor in an attempt to do so.

In addition, although the examiner argues that the steps recited in claims 1 and 6 of the present invention are mental process steps that are allegedly obvious in light of the Kung reference, mental process claims have been, and are, subject to the same legal requirements for patentability as applied to any other process or method. *See State St. Bank & Trust Co. v. Signature Fin. Group*, 149 F.3d 1368, 1374 (Fed. Cir. 1998). Thus, for at least the foregoing reasons, the Kung reference fails to disclose, teach or suggest each and every limitation set forth in independent claims 1 and 6 of the present invention. Accordingly, a *prima facie* case of obviousness has not been established and withdrawal of the rejection of these claims is respectfully requested. *See In re Royka*, 490 F.2d 981, 180 USPQ 580 (CCPA 1974) (“To establish *prima facie* obviousness of a claimed invention, all the claim limitations must be taught or suggested by the prior art”).

Moreover, aside from the novel limitations recited therein, claims 3-5 and 8-10, being dependent either directly or indirectly upon either allowable base claims 1 or 6, are also allowable for at least the reasons set forth above. Withdrawal of the rejection of these claims is therefore courteously solicited.

Conclusion

For at least the foregoing reasons, each of the presently pending claims in this application is believed to be in immediate condition for allowance. Accordingly, the examiner is respectfully requested to pass this application to issue. If the examiner has any comments or suggestions that could place this application in even better form, the examiner is invited to telephone the undersigned attorney at the below-listed number.

Applicant believes no fee is due with this response. However, if a fee is due, please charge our Deposit Account No. 18-0013, under Order No. SON-2192, from which the undersigned is authorized to draw.

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Respectfully submitted,

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